

REMARKS

Reconsideration of the Office Action is respectfully requested.

Claims 2 to 6, 14, and 24 are pending in the application.

As recited in the claims herein, the present invention is directed to removing a residue from a semiconductor substrate by treating the residue with reactive gas and ultraviolet radiation to render the residue soluble in deionized water, and then rinsing the substrate using deionized water as a final removal step. For example, see page 9, lines 5 to 11 of the specification.

Moreover, the gas need only be such that it reacts with the residue, there is no requirement that it be in special form such as in a supercritical or dense phase. This simplifies the equipment which can be used to carry out the process.

The claims stand rejected under 35 USC 103 as being unpatentable over Vaartstra, U.S. Patent No. 6,242,165 in view of Jackson, U.S. Patent No. 5,068,040. This rejection is respectfully traversed as applied to the claims presented herewith.

New claim 24 requires that the substrate be rinsed with deionized water after the exposure step to remove the residue. On the other hand, in both Vaartstra and Jackson, there is no rinsing step since the treatment with supercritical or dense fluids as required by these references is sufficient in and of itself to remove the residue.

The Office Action states that rinsing a substrate with deionized water after dry etching is well-known in the art, so it would be obvious to do so. However, it would not have been obvious to so modify Vaartstra or Jackson because such a rinse would have been superfluous in their

any  
processes, while it is a required step in the claimed process where the exposing step converts the residues to water-soluble/dispersable material, but does not yet remove them (see page 5, lines 9 to 11). Nothing in the prior art teaches the formation of water-soluble residues by using UV and an appropriate reactive gas. For example, the Vaartstra and Jackson patents do not teach the formation of water-soluble residues as a goal at all.

Additionally, Vaartstra requires the use of a supercritical gas, while Jackson requires the use of a dense fluid. These are critical features of the respective references, but as now recited in claim 24, are not required in the present invention. Thus, there is no suggestion in the present specification that a supercritical or dense fluid be used. In fact, an advantage of the present invention is that it can be performed in already existing equipment, for example in a photostabilizer unit (see page 9, line 9), whereas in Vaartstra and Jackson special equipment must be provided to compress the gas to supercritical or dense form.

It is thus submitted that independent claim 24 is clearly directed to allowable subject matter.

In view of the above, it is requested that a Notice of Allowance be rendered in the present application.

Berry et al  
Serial No.: 09/505,695

If the Examiner believes that a telephone conference would advance the prosecution of the application she is respectfully urged to contact the undersigned at the telephone number below.

Respectfully submitted,

A handwritten signature in cursive script, appearing to read "Martin Abramson", written over a horizontal line.

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## **APPENDIX A**

### **Version of Amendments to Claims with Markings to Show Changes Made**

Please amend claims 2 and 14 as follows:

2. (Amended) The method of claim [21] 24 wherein the gas and/or vapor is comprised of at least one member selected from the group consisting of amines, alcohols, thiols, ammonia, sulfur dioxide, sulfur dioxide and oxygen, sulfur trioxide, hydrogen sulfide, carbon dioxide, carbon monoxide, carbon sulfide, carbonyl sulfide, hydrogen peroxide, and water.

14. (Amended) The method of claim [21] 24 wherein the gas includes at least one member selected from the group consisting of ammonia, hydrogen and sulfur dioxide.